

WHAT IS CLAIMED IS:

1. A permanent magnet ring (1) formed by arranging a plurality of unit permanent magnets (5a, 5b, 5c, 5d ...), wherein each of said plurality of the unit permanent magnets (5a, 5b, 5c, 5d ...) is formed to have a circular cross section and in a cylindrical shape as a whole, and a predetermined number of the unit permanent magnets (5a, 5b, 5c, 5d ...) formed in the cylindrical shape are magnetically attracted each other on respective side surfaces R so as to form a ring shape having a predetermined size.

2. A permanent magnet ring (1) formed by arranging a plurality of unit permanent magnets (12a, 12b, 12c ...), wherein each of a plurality of said unit permanent magnets (12a, 12b, 12c ...) is formed in a spherical shape, and a predetermined number of the unit permanent magnets (12a, 12b, 12c ...) formed in the spherical shape are magnetically attracted each other on respective peripheral surfaces so as to form a ring shape having a predetermined size.

3. A permanent magnet ring (1) formed by arranging a plurality of unit permanent magnets (13a, 13b, 13c ...), wherein each of said plurality of the unit permanent magnets (13a, 13b, 13c ...) is formed in a flat shape, and a predetermined number of the unit permanent magnets

(13a, 13b, 13c ...) formed in the flat shape are magnetically attracted each other on respective side surfaces (R) so as to form a ring shape having a predetermined size.

4. A permanent magnet ring (1) formed by arranging a plurality of unit permanent magnets (14a, 14b, 14c ...), wherein each of a plurality of said unit permanent magnets (14a, 14b, 14c ...) is formed in a disc shape, and a predetermined number of the unit permanent magnets (14a, 14b, 14c ...) formed in the disc shape are magnetically attracted each other on respective side surfaces (R) so as to form a ring shape having a predetermined size.

5. A permanent magnet ring as claimed in any one of claims 1, 2, 3 and 4, wherein a plated layer is formed on a surface of said unit permanent magnet and a transparent siliceous coating layer is formed over the plated layer.

6. A permanent magnet ring formed by arranging a plurality of unit permanent magnets (21a, 21b, 21c ...), wherein each of the unit permanent magnets (21a, 21b, 21c ...) is formed in a cylindrical shape, a spherical shape, a flat shape, a disc shape or the like, and a predetermined number of the unit permanent magnets (21a, 21b, 21c ...) are magnetically attracted each other on

respective side surfaces (R) so as to be formed in a ring shape, wherein each of a plurality of said unit permanent magnets (21a, 21b, 21c ...) is a rare earth magnet such as a neodymium iron boron magnet, a samarium cobalt magnet and the like, and is a uniaxial anisotropic magnet in which an N pole or an S pole is formed on one part of the side surface (R) orthogonal to an easily magnetizing direction (X-X), which is formed at a time of molding a raw material including a rare earth element in a magnetic field, by magnetizing along said easily magnetizing direction (X-X) after sintering, and the S pole or the N pole is formed on another part of the side surface (R) opposite to said one part of the side surface, the side surface (R), on which the magnetic poles of the unit permanent magnet are formed, is formed to be a curved surface, and a predetermined number of the unit permanent magnets (21a, 21b, 21c ...), which are the uniaxial anisotropic magnets, are magnetically attracted each other in a line contact aspect or a point contact aspect on the curved side surfaces (R) on which the magnetic poles are formed, so as to be formed in a ring shape having a predetermined size.

7. A permanent magnet ring as claimed in claim 6, wherein said unit permanent magnets (21a, 21b, 21c ...) are formed in a circular cross sectional shape, and

formed in a cylindrical shape as a whole, and a predetermined number of the unit permanent magnets (21a, 21b, 21c ...) are magnetically attracted each other in a line contact aspect on the curved side surfaces (R) on which the magnetic poles are formed, so as to be formed in a ring shape.

8. A permanent magnet ring as claimed in claim 6, wherein said unit permanent magnets (21a, 21b, 21c ...) are formed in a spherical shape, and a predetermined number of the unit permanent magnets (21a, 21b, 21c ...) are magnetically attracted each other in a point contact aspect on the curved side surfaces (R) on which the magnetic poles are formed, so as to be formed in a ring shape.

9. A permanent magnet ring as claimed in claim 6, wherein said unit permanent magnets (21a, 21b, 21c ...) are formed in a flat shape, and a predetermined number of the unit permanent magnets (21a, 21b, 21c ...) are magnetically attracted each other in a line contact aspect on the curved side surfaces (R) on which the magnetic poles are formed, so as to be formed in a ring shape.

10. A permanent magnet ring as claimed in any one of claims 6, 7, 8 and 9, wherein a plated layer is formed on a surface of said unit permanent magnet, and a

transparent siliceous coating layer is formed over the plated layer.

11. A method of manufacturing unit permanent magnets (21a, 21b, 21c ...) in a permanent magnet ring structured such that each of the unit permanent magnets (21a, 21b, 21c ...) constituting the permanent magnet ring is formed in a cylindrical shape, a spherical shape, a flat shape, a disc shape or the like, and a predetermined number of the unit permanent magnets (21a, 21b, 21c ...) are magnetically attracted each other on respective side surfaces (R), comprising the steps of:

preparing an ingot on the basis of a raw material including a rare earth element;

crushing the ingot;

thereafter arranging crystals in a determined easily magnetizing direction (X-X) at a time of molding in a magnetic field;

manufacturing a block-shaped formed body in accordance with said molding in the magnetic field;

thereafter manufacturing a block-shaped sintered body by sintering;

next obtaining a plurality of unit permanent magnet raw materials by cutting;

working each of the unit permanent magnet raw materials in said cylindrical shape, the spherical

shape, the flat shape, the disc shape or the like;

thereafter forming a plated layer and a siliceous coating layer on a surface thereof;

next forming an N pole or an S pole on one part of a side surface (R) orthogonal to said easily magnetizing direction (X-X) of each of the unit permanent magnets (21a, 21b, 21c ...) by magnetizing the product thus made along said easily magnetizing direction (X-X), and the S pole or the N pole on another part of the side surface (R) opposite to said one part of the side surface; and

forming the side surface (R), on which the magnetic poles of the unit permanent magnet are formed, as a curved surface.